

AMENDMENTS TO THE CLAIMS

The following listing of claims replaces all prior listings, and all prior versions, of claims in the application.

LISTING OF CLAIMS:

1. (currently amended) An ultrasound diagnostic apparatus comprising:

a tomogram forming means for forming a tomogram of a diagnosis portion of an examinee by transmitting/receiving an ultrasound wave to/from the examinee via an ultrasound probe;

color Doppler image forming means for forming a color Doppler image based on a Doppler signal obtained from the diagnosis portion;

a transparency control means for controlling a degree of the transparency of the color Doppler image;

selection means for selecting one or both of a luminance/hue color bar, which is based on the information of a velocity and/or variance of a blood flow, and/or a transparency color bar, which is based on the information of the variance, for alternatively or simultaneously displaying the luminance/hue color bar and/or the transparency color bar on the display means;

image processing means for performing image processing on the tomogram and the color Doppler image; and

display means for displaying images obtained by the image processing means, the tomogram and the color Doppler image being color displayed on the display means,

wherein the image processing means causes the color Doppler image to be displayed transparently, based on the degree of transparency selected by the

transparency control means and one or both color bars selected by the selection means;

~~characterized in further comprising:~~

~~a transparency control means for controlling a degree of the transparency of the color Doppler image of the transparent display; and selection means for selecting one or both of a luminance/hue color bar, which is based on the information of a velocity and variance of a blood flow, and/or a transparency color bar, which is based on the information of the variance, for alternatively or simultaneously displaying the luminance/hue color bar and/or the transparent color bar on the display means.~~

2. (original) The ultrasound diagnostic apparatus according to claim 1, wherein the display means displays information composed of the color display and the transparent display.

3. (previously presented) The ultrasound diagnostic apparatus according to claim 1, further comprising selection means for selecting one of the color display and the transparent display, wherein the display means displays the information selected by the selection means.

4. (cancelled)

5. (previously presented) The ultrasound diagnostic apparatus according to claim 1, wherein the transparency control means controls a degree of the transparency based on blood flow information of the color Doppler image.

6. (previously presented) The ultrasound diagnostic apparatus according to claim 1, wherein the transparency control means controls a degree of the transparency based on a variance of a blood flow of the color Doppler image.

7. (previously presented) The ultrasound diagnostic apparatus according to claim 1, wherein the transparency control means sets the transparency of the color Doppler image in such a manner that the transparency is reduced with an increase in a variance of the blood flow.

8. (previously presented) The ultrasound diagnostic apparatus according to claim 1, wherein the transparency control means obtains the variance as a relative value to display the color Doppler image as: an opaque image when the variance is maximum; a transparent image when the variance is null; or a semi-transparent image when a variance is not maximum nor null.

9. (original) The ultrasound diagnostic apparatus according to claim 1, wherein the display means displays a transparent color bar representing the transparency of the color Doppler image of the color display.

10. (cancelled).

11. (previously presented) The ultrasound diagnostic apparatus according to claim 1, further comprising luminance/hue control means for controlling a hue of the color Doppler image of the color display, wherein the transparency control means

and the luminance/hue control means control a luminance, a hue, and a transparency based on the blood flow information to create a three-dimensional color Doppler image.

12. (previously presented) The ultrasound diagnostic apparatus according to claim 11, further comprising:

means for arranging a speed/reflection intensity and variance data of the Doppler signal in each of three-dimensional voxels in accordance with a position of each of planes;

means for deciding a luminance/hue of each of the three-dimensional voxels based on the speed and a variance; and

means for deciding a transparency of each of the three-dimensional voxels based on the variance.

13. (original) The ultrasound diagnostic apparatus according to claim 11, wherein the display means displays a turbulence portion of the blood flow of the three-dimensional color Doppler image.

14. (original) The ultrasound diagnostic apparatus according to claim 1, wherein the color Doppler image forming means comprises:

a phase comparator outputting a cosine component and a sine component of the Doppler signal;

an MTI filter damping a low frequency component of the cosine component signal and the sine component signal and extracting a high frequency component of the cosine component signal and the sine component signal;

an autocorrelation calculation means calculating an average speed, a variance, and power of the blood flow;

a digital scan converter rearranging in accordance with a television scanning method; and

a color encoder performing colorization corresponding to the speed and the variance.

15. (previously presented) The ultrasound diagnostic apparatus according to claim 1, comprising luminance/hue display means for displaying a luminance/hue color bar representing a color of the color Doppler image of the color display, wherein the luminance/hue color bar changes in color in such a manner that: black is displayed at a portion corresponding to the blood flow speed of 0; the change in the case of a positive direction speed is displayed as a gradual change from dark red to orange and then to yellow in accordance with the increase in variance; and the change in the case of a negative direction speed is displayed as a gradual change from dark blue to light blue and then to green in accordance with the increase in variance.

16. (previously presented) The ultrasound diagnostic apparatus according to claim 1, wherein the image processing means comprises storage means for storing data of a plurality of color Doppler images and reads out the data from the storage means to perform the image processing on the data of speeds, reflection intensities, and variances of the plurality of the color Doppler images.

17. (currently amended) An ultrasound diagnosing method comprising:
a transmitting/receiving step for transmitting/receiving an ultrasound wave to/from an examinee via an ultrasound probe;
a forming step for forming a tomogram of a diagnosis portion of the examinee;
an imaging step for forming a color Doppler image based on a Doppler signal obtained from the diagnosis portion;

a step of selecting one or both of a luminance/hue color bar, which is based on the information of a velocity and variance of a blood flow, and/or a transparency color bar, which is based on the information of the variance, for alternatively or simultaneously displaying the luminance/hue color bar and/or the transparent color bar on the display means;

an image processing step for performing image processing on the tomogram and the color Doppler image based on the result of the selecting step;

a first display step for displaying the images which underwent the image processing so as to display the tomogram and the color Doppler image in color display; and

a second display step for displaying the color Doppler image transparently which includes a control step for controlling a degree of the transparency of the color Doppler image of the transparent display; and

~~a step of selecting one or both of a luminance/hue color bar, which is based on the information of a velocity and variance of a blood flow, and/or a transparency color bar, which is based on the information of the variance, for alternatively or simultaneously displaying the luminance/hue color bar and/or the transparent color bar on the display means.~~

18. (previously presented) The ultrasound diagnosing method according to claim 17, further comprising:

a measuring step for measuring a plurality of color Doppler images;

an arranging step for arranging speed/reflection intensity and variance data of the color Doppler images in each of three-dimensional voxels corresponding to each of planes;

a first deciding step for deciding color information of a luminance/hue of each of three-dimensional voxels based on the speed and the variance;

a second deciding step for deciding a transparency of each of the three-dimensional voxels based on the variance; and

a rendering step for performing volume rendering based on parameters decided by the foregoing steps and creating a projection image to be displayed.

19. (previously presented) The ultrasound diagnostic apparatus according to claim 1, wherein the plurality of color Doppler images are acquired and they are subjected to volume rendering so as to create a projection image to be displayed.

20. (previously presented) The ultrasound diagnostic apparatus according to claim 19, further comprising:

measuring means for measuring a plurality of color Doppler images;

arranging means for arranging speed/reflection intensity and variance data of the color Doppler images in each of three-dimensional voxels corresponding to each of planes;

first a deciding means for deciding color information a luminance/hue of each of three-dimensional voxels based on the speed and the variance;

second deciding means for deciding a transparency of each of the three-dimensional voxels based on the variance; and

rendering means for performing volume rendering based on parameters decided by the foregoing steps and creating a projection image to be displayed.